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ceæ and Santalaceæ), and (2) Sympetalæ, beginning with Bicornes and ending with Aggregatæ.

An appendix, contributed by the translator, gives a useful tabulation of the system of Ray (1703), Linnæus (1733), A. L. de Jussieu (1789), A. P. DeCandolle (1819), Endlicher (1836-40), Brongniart (1843), Lindley (1845), A. Braun (1864), Bentham and Hooker (1862-83), Sachs (1882), Eichler (1883), Engler (1892). N. L. B.

The Story of the Stars. G. F. CHAMBERS.

New York. D. Appleton & Co. 1895.

Pp. 160.

THE Messrs. Appleton have begun with this small monograph their *Library of Useful Stories*, a series of paper covered booklets intended to embrace the ground of science, history, etc. This initial number, by Mr. George Chambers, an English astronomical writer of long experience, proves to be rather better than a first impression would lead one to judge; for the illustrations, which first strike the eye, are for the most part simply execrable. What excuse for the absence of more and better ones, in these days of inexpensive engraving? Its curiously insular mannerisms might readily have been corrected by a half hour's work of an American editor, who should also have toned down those provincial oddities of style which mar this book even more, because of its smaller size, than the same author's large *Descriptive Astronomy*.

Curiously false implications are wrought into the first chapter, though only a page or two in length. If the manifold uses of astronomy are to be competently brought before the public mind to-day, and the reasons for the support of that science from the public exchequer suitably defended, it is only by telling a few simple things exactly as they are. Now, it may be true in England that, if "the staff belonging to either establishment [the Royal Observatory or

the Nautical Almanac Office] were to resort to the fashionable expedient of a strike for higher pay," then, among other dire results, "Our railway system would become utterly disorganized. A few trains could run, but the intervals between them would have to be considerable, and they could only travel by daylight and at very low speeds," but we do not exactly see why. Rather the fact is that, if both these establishments were permanently closed henceforth, the present state of astronomy is such that all the public business of determining time for railways and of preparing data for navigating ships could be done for the fiftieth part of the budget now devoted to the Nautical Almanac and the Royal Observatory; and any government maintaining such costly establishments, with their corps of trained observers and expert computers, merely for this simple though important purpose, would be very foolish indeed. Not only would the expenditure be extravagant, but wholly unjustifiable. These institutions are maintained for quite other purposes; and the significant work of the great government observatories (excellently done in England, France and Russia, and which in this country we have been trying for a half century to do, though not succeeding very well because the proper organization is lacking) lies in quite other fields, the immediate serviceableness of which is by no means universally conceded. Blanketing all this under the antiquated plea of utility in time and navigation is clearly wrong and wholly indefensible.

Mr. Chambers's attempt to popularize seems rather hard, and on the whole of doubtful success. Excellent scientific explanations go on for a while, when suddenly the author, seemingly suspecting that he is less interesting than he ought to be, plunges patchily into something purely literary, or indulges in some incongruous expression not exactly ludicrous, but giving an undignified

cast to essays on the most dignified subject in the whole range of the sciences. No carelessness or vulgarity in style was ever a compliment to the literary taste of a reader, and neither the cause of literature, science nor anything else is likely to be enhanced by allusions to 'some Germans nibbling' at stellar photometry; or by ponderous anecdotes about hypothetical carrots, "that grew so well that the roots reached right through to the other side of the earth."

The proof revision has been none too carefully done—illustrations on pages 60 and 116 have been interchanged; the incorrect spelling of Palitzsch would not perhaps attract attention, except that the author, being also the compiler of a handy little German-French-English lexicon, we expect better things of him; and while 'Bob' passes current everywhere for Robert, 'Boberts' will scarcely do for Roberts. The general scientific reliability of statement is fully up to the standard expected of Mr. Chambers, and only one or two inaccuracies need be pointed out—at the middle of page 18, where he should have written, 'a *vertical* plane passing through the zenith;' and on page 73, where the exact opposite of what is meant is inadvertently said, regarding the stars 'converging towards' a point in Hercules.

Of course in so small a book one must not expect everything; but some omissions are noteworthy. In even a magazine article about the stars a single page about their distances would be only too brief, but Mr. Chambers gives only this amount in a volume of 150 pages, with no allusion to the name of Bessel in this connection, or Brünnow or Gill. The classic work of Dr. Gould should not have been omitted. The superb advances of stellar photography in the hands of the brothers Henry, Russell, Gill, Barnard, Roberts, Wolf and others are barely alluded to, or left out entirely. The accurate researches on the brightness of stars by the Potsdam astronomers are wholly

ignored. If the space of six pages could be given to 'The Stars in Poetry,' and a third of that amount to speculative 'rubbish' regarding the origin of the Milky Way, is it quite the thing to have crowded out completely the nebular hypothesis, which has engaged such master minds as Herschel, La Place, Lord Kelvin and Darwin? Several chapters are almost purely descriptive, or mere geography of the heavens, as if a handbook for the use of small telescopes; a little yeast here would have done no harm; but it should be pervasive and inherent—not added as an afterthought. Mr. Maunder has appended an excellent chapter on the marvels of the spectroscope as applied to the stars and nebulae.

It is not, however, intended to imply that there is not much that is excellent in Mr. Chambers's *Story of the Stars*, both as to form and arrangement. Its convenient size, clear type and authoritative statements (even with occasional lapses into 'dread' technicalities) render it, on the whole, an intelligible and interesting booklet, which will be a vast help to the student and general reader, and is worth double what the publishers ask for it. But the author has far from succeeded in making the most and best of his opportunity. DAVID P. TODD.

AMHERST COLLEGE.

The World of Matter: A Guide to the Study of Chemistry and Mineralogy. By HARLAN H. BALLARD, A. M. Boston, D. C. Heath & Co. 1894.

The object of this book is apparently to enable those who may not have an opportunity to study natural phenomena in a thorough way to obtain some comprehension of the objects and methods of scientific investigation by means of a few well chosen experiments. The object is a good one; will a study of this book further it?

It is impossible to say definitely, yes or no. The explanations, so far as they go, are generally excellent, but the tendency of the